Trend Study 25C-9-03

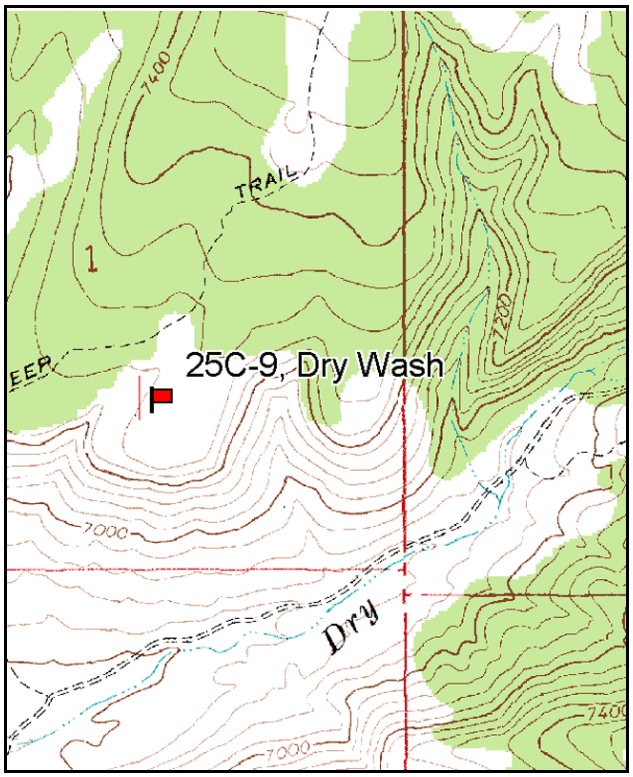
Study site name: Dry Wash . Vegetation type: Big Sagebrush-Grass .

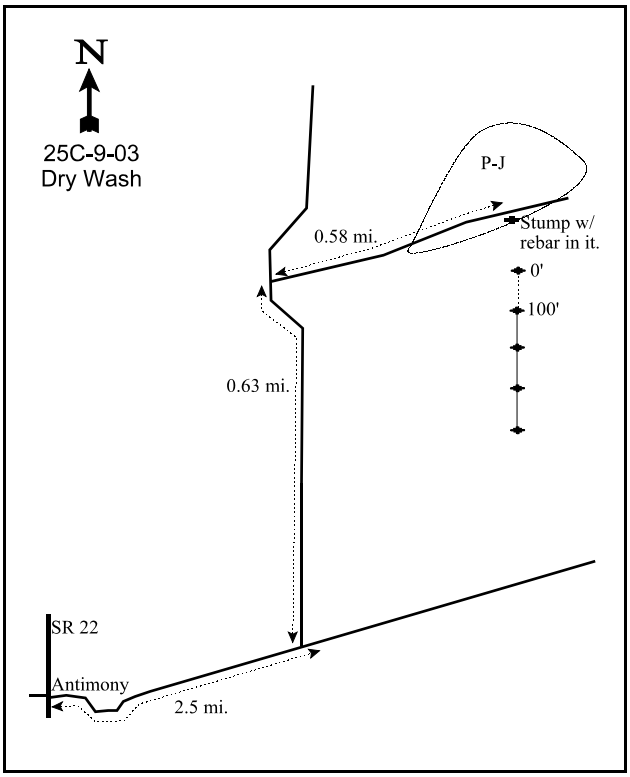
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (95ft), line 2 (11ft & 71ft), line 3 (34ft), line 4 (59ft).

LOCATION DESCRIPTION

From the town of Antimony, go east on the dump road (off Main between the Antimony school and Antimony mercantile) 2.5 miles up Dry Wash Canyon then turn left. Go up the hill 0.63 miles to the top of the ridge and turn right. Go 0.58 miles to a small stump on the right side with tagged rebar #7176 on it. The baseline stake is 688 feet away at 165 degrees magnetic. Measure with a tape to make it easier to find the short rebar that marks the baseline. The 0-foot baseline stake is tagged #7177. The 100-foot end of the baseline is marked by a rebar that is actually 101 feet away because of rocks.





Map Name: Angle

Diagrammatic Sketch

Township 31S , Range 2W , Section 1

GPS: NAD 27, UTM 12S 4221048 N, 416184 E

DISCUSSION

Dry Wash - Trend Study No. 25C-9

The Dry Wash trend study is located on a rocky knoll east of the town of Antimony at an elevation of 7,300 feet. The transect runs up a 10% north facing slope which drops off at a steep, boulder-strewn cliff. The range type is Wyoming big sagebrush-grass. The trend study samples an island of Wyoming big sagebrush which receives concentrated use. Surrounding areas are dominated by increaser species including rabbitbrush, broom snakeweed, and pinyon-juniper. Grazing pressure from livestock has been very heavy on this BLM administered land in the past. There is also considerable use from deer, with an estimated 22 deer days use/acre estimated in 1991 (54 ddu/ha). Elk use was lower at only 5 elk days use/acre. Pellet group data from 1998 estimated a higher amount of big game use at 40 deer and 54 elk days use/acre (99 ddu/ha and 133 edu/ha). Cow use was estimated at only 4 days use/acre. Big game use increased in 2003 to 66 deer and 78 elk days use/acre (164 ddu/ha and 193 edu/ha). Cattle use remained low at 3 days use/acre (7 cdu/ha).

The site is very rocky but soils have fair depth with an effective rooting depth of 12 inches. Soil texture is a sandy loam which is slightly acidic (pH 6.3). Parent material is basalt and these dark colored rocks cover half of the ground surface. Rocks are also common within the profile. Due to the high amounts of rock on the surface and within the profile, average soil temperature is fairly high, estimated at 70.8°F at a depth of almost 14 inches in 1998 and 64°F at 12 inches in 2003. Erosion is slight with low amounts of bare ground. There are no active gullies on the site.

The dominant browse species is Wyoming big sagebrush which provided 58% of the total shrub cover in 2003. There is also some black sagebrush on the site and hybridizing between the two species is taking place. However, all sagebrush has been classified as Wyoming big sagebrush. Population density was estimated at 4,660 plants/acre in 2003. The population is dynamic with excellent young recruitment during most readings. Utilization has been moderate to heavy with good vigor on most plants. The number of decadent plants has remained acceptable at around 15% with higher levels of 31% and 37% during the drought years of 1991 and 2003.

Other important browse species found on the site include winterfat and fourwing saltbush. Individual winterfat plants are small, averaging only 4 to 5 inches in height. It appears that much of the annual growth is utilized each year. Population density was fairly stable from 1985 - 1998, but declined substantially in 2003. Utilization was heavy in 1985 and 2003, moderate in 1991 and 1994, and moderate to heavy in 1998. Vigor has remained good and few decadent plants have been found on the site. Fourwing saltbush occurs in low numbers of about 350 plants/acre. It has showed continued heavy use, yet shows mostly normal vigor and low to moderate decadence.

The site also supports fairly large populations of broom snakeweed and narrowleaf low rabbitbrush. Pinyon and juniper trees are found scattered on the site at an estimated density of 33 pinyon and 18 juniper trees/acre in 1998. Average truck diameter was 3.5 inches for both species.

The herbaceous understory is not very productive. Perennial grasses combined to produce only 6% cover in 1994, 7% in 1998, and 5% in 2003. The most common perennial grasses are blue grama and needle-and-thread grass. Indian ricegrass is also fairly abundant. Cheatgrass, an undesirable annual, was found in small numbers in 1994. It increased nearly 10 fold in nested frequency by 1998. It provided only 1.2% cover in 1998, increasing to 4% in 2003. Cheatgrass will likely increase unless there is significant competition from perennial grasses. Forbs are lacking and produced less than ½ of 1% cover in 1994 and 1998.

1985 APPARENT TREND ASSESSMENT

The soil trend appears stable. An increase in vegetative cover, especially growing between and around rocks

is desirable, but difficult to establish unless the site is rested. The key species, Wyoming big sagebrush, has a stable population and appears able to sustain it's current level of utilization. Winterfat is also a very important species here, but the heavy hedging and resulting poor vigor may reduce it's ability to maintain itself in the stand. A reduction in grazing and rest every third year should increase production of the winterfat and fourwing saltbush, as well as benefit the entire vegetative community.

1991 TREND ASSESSMENT

It appears that percent bare ground has decreased since 1985, but percent rock cover is increasing. Other soil parameters are similar to 1985 estimates so the trend is considered stable, but still in poor condition. The Wyoming big sagebrush population has declined by 18%, fourwing saltbush has declined by 34%, winterfat has declined by 33%, all indicating a slightly downward trend for browse. In addition, percent decadence increased to 31% for Wyoming big sagebrush. Broom snakeweed has decreased by a remarkable 94%, which is the only decrease that would be welcome on this site. Low rabbitbrush was the only browse species that increased in density since 1985 (42%). Overall trend for browse is considered slightly down. There are 10 herbaceous understory species, and only 3 species showed any increase. Dominant grasses, blue grama and needle-and-thread, declined but only needle-and-thread showed a significant decline in nested frequency. The herbaceous trend is considered downward.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - down (1)

1994 TREND ASSESSMENT

Trend for soil is still stable, but in poor condition. Percent cover of bare ground is consistent with what it was estimated in 1985. Litter cover has continued to slowly decrease through time. The browse trend is mixed with broom snakeweed having an overall declining trend from 1985 and narrowleaf low rabbitbrush having remained fairly steady since 1991. Winterfat has had an interesting up and down change in it's density since 1985. Overall, it has increased by 8% since 1985. The key species with the highest relative cover value is Wyoming big sagebrush. It shows a slight decrease in it's density. Percent decadence has decreased to only 14% and the percentage of plants being moderately to heavily hedged has also decreased. Trend for browse is considered stable with the losses of sagebrush counterbalanced by the increase in winterfat and fourwing saltbush. The herbaceous understory trend is slightly up, considering the increase in sum of nested frequency for the grasses and forbs. Nested frequency of blue grama increased significantly. Forbs are still rare.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - up slightly (4)

1998 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics are similar to 1994 estimates. Cover of bare ground is low and erosion in minimal. The browse trend appears stable for the key species, Wyoming big sagebrush and winterfat. Density of Wyoming big sagebrush declined from 4,440 plants/acre in 1994 to 2,660 by 1998. Some of the change is due to a decline in young plants. Utilization was mostly light to moderate but heavier than 1994 estimates. Percent decadence is still low at only 15%, however 63% of those decadent plants were classified as dying (>50% crown death). Recruitment is good, with enough young plants present to replace the decadent/dying individuals. Winterfat density has declined 26% from the extremely high number of 18,520 plants/acre estimated in 1994. However, strip frequency and cover of winterfat increased suggesting

that density estimates in 1994 may have been overestimated. Utilization is heavier but vigor is good and there are no decadent plants. In addition, reproduction is good with 23% of the population consisting of young plants. Fourwing saltbush also shows heavier use compared to 1994 estimates and a slight decline in density. Overall, trend for browse is considered stable. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses has remained similar to 1994 estimates while nested frequency of perennial forbs has increased slightly. One negative factor is the significant 10 fold increase in frequency of cheatgrass. It still only produces just over 1% cover, however a continued increase would be detrimental.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is up slightly. Average cover of vegetation and litter increased slightly while cover of bare ground declined to only 4%. Rock and pavement cover increased. Trend for browse is stable for Wyoming big sagebrush but down for winterfat. Density of sagebrush is similar to 1994 estimates. Utilization is moderate to heavy but vigor is normal on most plants. The number of decadent plants increased to 37% of the population and 34% of the decadent sagebrush were classified as dying. Recruitment is fair with 6% of the population consisting of young plants. However, this is not enough to replace all of the decadent & dying plants. Winterfat has declined 60% since 1998 from nearly 12,000 plants/acre to 4,760 plants/acre. Use was extremely heavy in 2003, but vigor remained good and decadence low. Another preferred shrub, fourwing saltbush, shows a stable trend. Taking all of these factors into consideration, trend for browse is considered slightly down. Trend for the herbaceous understory is down slightly. Sum of nested frequency of perennial grasses declined slightly with a significant decline in the frequency of Indian ricegrass and bottlebrush squirreltail. The most abundant perennial grasses, blue grama and needle-and-thread increased slightly. Perennial forbs are rare and have declined in nested frequency. Only 1 perennial forb was found on the site in 2003.

TREND ASSESSMENT
soil - up slightly (4)
browse - down slightly (2)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Management unit 25C, Study no: 9

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'94	'98	'03	'94	'98	'03
G	Bouteloua gracilis	$_{ab}$66	$_{a}$54	$_{b}$100	$_{a}$53	$_{ab}$91	3.13	2.19	2.37
G	Bromus tectorum (a)	-	-	$_{a}$16	$_{b}$154	$_{b}$151	.06	1.20	3.86
G	Oryzopsis hymenoides	$_{b}$116	$_{b}$98	$_{b}$109	$_{b}$99	$_{a}$46	1.21	1.02	.74
G	Sitanion hystrix	$_{b}$76	$_{b}$74	$_{b}$79	$_{b}$95	$_{a}$32	.85	1.06	.31
G	Sporobolus cryptandrus	$_{c}$31	$_{b}$12	$_{ab}$3	$_{ab}$5	$_{a}$-	.03	.18	-
G	Stipa comata	$_{b}$100	$_{a}$59	$_{ab}$75	$_{ab}$97	$_{b}$111	.85	2.24	1.75
Total for Annual Grasses		0	0	16	154	151	0.06	1.20	3.86

Type	Species	Nested Frequency					Average Cover %		
		'85	'91	'94	'98	'03	'94	'98	'03
Total for Perennial Grasses		389	297	366	349	280	6.08	6.72	5.19
Total for Grasses		389	297	382	503	431	6.15	7.92	9.05
F	Arabis demissa	3	-	-	-	-	-	-	-
F	Astragalus spp.	-	1	3	4	-	.03	.01	-
F	Castilleja spp.	-	-	-	1	-	-	.00	-
F	Chenopodium album (a)	-	$_{c}$58	$_{b}$20	$_{a}$-	$_{a}$-	.08	-	-
F	Cryptantha spp.	-	-	4	5	-	.01	.02	-
F	Descurainia pinnata (a)	-	-	$_{b}$82	$_{a}$-	$_{b}$94	.17	-	.60
F	Erigeron pumilus	9	2	12	17	1	.05	.06	.03
F	Lappula occidentalis (a)	-	-	$_{b}$61	$_{a}$15	$_{b}$61	.11	.03	.30
F	Salsola iberica (a)	$_{a}$3	$_{b}$59	$_{a}$-	$_{a}$-	$_{a}$-	-	-	-
Total for Annual Forbs		3	117	163	15	155	0.36	0.03	0.90
Total for Perennial Forbs		12	3	19	27	1	0.09	0.10	0.03
Total for Forbs		15	120	182	42	156	0.45	0.13	0.93

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25C, Study no: 9

Type	Species	Strip Frequency			Average Cover %		
		'94	'98	'03	'94	'98	'03
B	Artemisia tridentata wyomingensis	71	57	83	8.25	5.23	9.92
B	Atriplex canescens	15	12	13	2.01	.98	1.58
B	Ceratoides lanata	52	56	47	2.40	4.69	.78
B	Chrysothamnus nauseosus	0	1	2	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	24	34	31	1.63	2.69	.67
B	Gutierrezia sarothrae	33	38	59	.51	.97	1.05
B	Juniperus osteosperma	0	0	0	-	.15	-
B	Opuntia spp.	3	2	3	-	-	-
B	Pediocactus simpsonii	0	1	0	-	.03	-
B	Pinus edulis	0	1	8	1.00	2.11	3.06
Total for Browse		198	202	246	15.82	16.87	17.09

CANOPY COVER, LINE INTERCEPT --
Management unit 25C, Study no: 9

Species	Percent Cover	
	'98	'03
Artemisia tridentata wyomingensis	-	7.58
Atriplex canescens	-	.96
Ceratoides lanata	-	.41
Chrysothamnus viscidiflorus stenophyllus	-	1.70
Gutierrezia sarothrae	-	.40
Opuntia spp.	-	.08
Pinus edulis	4.59	6.94

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25C, Study no: 9

Species	Average leader growth (in)
	'03
Ceratoides lanata	3.6
Artemisia tridentata wyomingensis	1.7

POINT-QUARTER TREE DATA --
Management unit 25C, Study no: 9

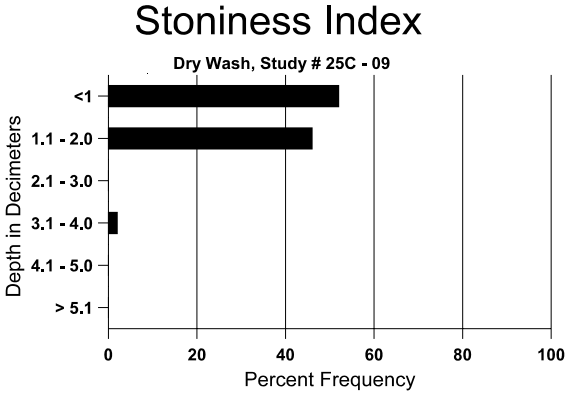
Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Pinus edulis	40	N/A	3.5	N/A

BASIC COVER --
Management unit 25C, Study no: 9

Cover Type	Average Cover %				
	'85	'91	'94	'98	'03
Vegetation	4.00	4.50	23.49	25.56	27.10
Rock	24.75	36.75	29.15	29.29	35.18
Pavement	24.75	20.75	11.21	20.95	21.31
Litter	34.50	30.50	27.61	23.70	24.66
Cryptogams	.75	0	.00	0	.66
Bare Ground	11.25	7.50	11.68	17.37	4.47

SOIL ANALYSIS DATA --
Management unit 25C, Study no: 9, Study Name: Dry Wash

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
11.9	64.0 (11.7)	7.2	48.0	29.4	22.6	3.5	9.7	179.2	0.5



PELLET GROUP DATA --
Management unit 25C, Study no: 9

Type	Quadrat Frequency			Days use per acre (ha)	
	'94	'98	'03	'98	'03
Rabbit	33	38	8	-	-
Horse	-	1	-	-	-
Elk	30	37	26	54 (133)	78 (193)
Deer	33	37	23	40 (99)	66 (164)
Cattle	-	4	1	4 (10)	3 (7)

BROWSE CHARACTERISTICS --
Management unit 25C, Study no: 9

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
85	**6598**	5666	3666	1866	1066	-	46	19	16	8	14/18
91	**5399**	-	1600	2133	1666	-	48	15	31	9	13/20
94	**4440**	240	1080	2820	540	760	10	11	12	7	16/27
98	**2660**	240	700	1580	380	440	32	.75	14	9	13/21
03	**4660**	-	280	2660	1720	720	35	22	37	12	13/22

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Atriplex canescens											
85	**199**	-	-	133	66	-	33	67	33	0	13/14
91	**132**	-	66	66	-	-	0	50	0	0	23/9
94	**460**	-	40	360	60	-	22	4	13	9	22/28
98	**340**	-	60	240	40	-	65	12	12	6	20/27
03	**360**	-	20	240	100	-	44	33	28	6	22/27
Ceratoides lanata											
85	**17066**	3733	9200	7800	66	-	41	51	0	11	2/3
91	**11399**	-	3733	7666	-	-	68	0	0	0	8/5
94	**18520**	-	2040	16480	-	-	17	11	0	0	5/6
98	**11900**	-	2740	9160	-	-	62	29	0	0	4/5
03	**4760**	-	60	4680	20	120	21	71	0	0	5/5
Chrysothamnus nauseosus											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**60**	-	60	-	-	-	0	0	-	0	-/-
03	**60**	-	40	20	-	-	67	0	-	0	-/-
Chrysothamnus viscidiflorus stenophyllus											
85	**732**	66	133	533	66	-	9	0	9	0	8/13
91	**1266**	-	333	533	400	-	21	0	32	5	7/11
94	**1260**	60	560	700	-	-	5	5	0	0	9/16
98	**2820**	-	480	2340	-	20	0	0	0	0	9/13
03	**1480**	-	-	1360	120	80	0	0	8	0	7/12
Gutierrezia sarothrae											
85	**7798**	4066	2866	4866	66	-	0	0	1	2	7/7
91	**466**	333	200	266	-	-	0	0	0	0	6/5
94	**1360**	-	300	1040	20	-	0	0	1	0	7/9
98	**1320**	20	260	1040	20	60	0	0	2	2	9/10
03	**4040**	160	1840	2080	120	160	2	0	3	1	6/7
Opuntia spp.											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**60**	-	-	60	-	-	0	0	-	0	4/11
98	**40**	-	-	40	-	-	0	0	-	0	5/11
03	**60**	-	-	60	-	-	0	0	-	0	3/11

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Pediocactus simpsonii											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**20**	-	-	20	-	-	0	0	-	0	1/4
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Pinus edulis											
85	**133**	-	133	-	-	-	0	0	-	0	-/-
91	**133**	-	133	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**20**	-	20	-	-	-	0	0	-	0	-/-
03	**160**	-	20	140	-	-	0	0	-	0	-/-